

walks round a field and successively plants his staff upright where a change in the directions of the boundary occurs ; at each point the observer at the plane table rules the direction line and marks the distance, repeating the operation for each successive point, so that the survey of the field is made during the time taken by the staff man in walking round the field and making the necessary halts at each point for the observation to be recorded. The scale and view photographed through the plane table instrument is shown in Fig. 3.

The same optical principle has also been employed by Sir Howard Grubb in the construction of a level to be used in making rapid estimates of gradients in road making and laying out property.

The observer sees at the same instant a fiducial mark, the bubble of the level, and an arc marked with degrees projected on to the field of view.

The excellent optical device has also been utilised in the construction of a prismatic compass and a clinometer.

#### M. HERVÉ FAYE.

ALL who have taken any interest in the advance of science, more particularly in the direction of astronomy and meteorology, will hear with regret of the death of M. Hervé Faye, which sad event was announced last week. A long course of scientific industry has marked his career, and a great distance seems to separate the workers of to-day from the epoch when Faye and many others, whose names are now but a matter of history, laboured strenuously and successfully to make the paths for their successors more easy and of more rapid attainment. Nearly sixty years have passed since M. Faye first came prominently before the world as the discoverer of a comet, to which his name has always been attached, and it will serve to make us appreciate the advance accomplished in one lifetime if we recall the fact that this was the first elliptic comet the period of which was determined by calculation alone, without any assistance drawn from observations made at previous returns. Faye, at that time an assistant in the Paris Observatory, recognised the necessity of computing an elliptic orbit, but the credit of determining the first orbit of considerable eccentricity from a few days' observations belongs to Goldschmidt, who was stimulated to the task by Gauss. Then the information and the methods of the *Theoria Motus* had not filtered through a score of text-books and come into the hands of numberless computers, whose deftness of calculation had been whetted by the discovery of hundreds of asteroids, the orbits of which stood in need of determination.

But it will be rather on his philosophical writings than his scientific observations that the reputation of Faye will rest and be honoured by his countrymen. It may be that to some of his theories a general assent has not been given, and that in some cases later discoveries have modified the views the distinguished physicist expressed, but no doubt will be entertained concerning the clearness and ability with which those views have been uttered, or of the influence they have had on French thought. Ever since the time that Laplace in a few pregnant sentences sketched the plan on which the solar system might have been constructed, the subject has been a favourite speculation among French physicists. M. Faye has not been able to resist the temptation to attack this subject, and though, like all attempts at universe construction, the scheme of M. Faye fails to meet all the difficulties which beset the problem, yet it is a most suggestive contribution to the subject, and should prove an incentive to further inquiry. In some respects this cosmogonic theory contrasts very favourably with that of Laplace, and in others, as was natural, it falls behind that of his great predecessor ; but this is

not the place to enter into any details or criticisms of the argument developed. In recalling, however, the services which M. Faye rendered, one would not willingly forget this finished essay ("Sur l'Origine du Monde"), in which is given, with much that is suggestive, a lucid explanation of the state of our knowledge of the solar and stellar systems.

Similarly, it would be out of place to discuss here the views he expressed on the constitution of the sun, the causes of sun-spots, the behaviour of solar prominences or the chemistry of the sun generally. All these are subjects that fell under Faye's notice and which he treated broadly and philosophically, but necessarily without the facts and knowledge that later observations have brought to light. In cosmical physics and chemistry he was to a great extent a pioneer, and if his theories are in some cases for this reason insufficiently supported by exact observation, they are generally characterised by a breadth of view and thoroughness of conception that contrasts favourably with contemporary opinion. In the discussion of problems connected with cosmical meteorology, or with the motions of our own atmosphere, he was, perhaps not so happy, and his writings on cyclonic motions, the laws of storms, the behaviour of tornadoes, and the exceptional phenomena which we occasionally experience will probably be soon forgotten. Not so, however, with such works as the "Cours d'Astronomie nautique" and other mathematical books with which he has enriched French literature, and which are models of arrangement and of clearness of expression.

One could with difficulty recall the numerous services which M. Faye rendered to his Government or the acknowledgments that he received from foreign scientific bodies. He was, of course, Membre de l'Institut and besides a seat at the Bureau des Longitudes which he had occupied since 1862, in succession to Biot, he was called by Marshal MacMahon to fill in his Cabinet the office of Minister of Instruction, at a time when it was thought not impossible that M. Faye might have become Director of the Paris Observatory in succession to Le Verrier. He was elected a Foreign Associate of the Royal Astronomical Society so long ago as 1848, while Belgium, Venice, the United States of America enrolled him among the members of their scientific societies. Full of years and distinction he is removed from us, and with him another link that connects the science of to-day with the science of the past.

W. E. P.

#### NOTES.

THE new botanical laboratories of the Chelsea Physic Garden are to be opened by Earl Cadogan at a garden party there on Friday, July 25.

A REUTER telegram from Kronstadt in yesterday's *Times* reports that on July 14 the Italian cruiser *Carlo Alberto* received, for the first time, messages by wireless telegraphy from the Poldhu station in Cornwall. These are the first experiments in wireless telegraphy over a distance of 1600 English miles in a straight line by land, and the results are said to have been most successful, the messages received having been very distinct.

AMONG the Civil List Pensions announced in a Parliamentary Paper just issued are the following :—Mr. W. H. Hudson, in recognition of the originality of his writings on natural history, 150*l.* ; the Rev. Dr. John Kerr, F.R.S., in recognition of his valuable discoveries in physical science, 100*l.* ; Mrs. S. C. Jones, in recognition of the services rendered by her late husband, Principal John Viriamu Jones, to the cause of higher education in Wales, 75*l.* ; and Mr. H. Ling Roth in consideration of his services to anthropology, 70*l.*

THOUGH the damage done in Salonica by the earthquake which occurred there on the afternoon of July 5 (see p. 254) was not great, some of the surrounding villages suffered considerably. At Guvezno 150 houses were wrecked and at Karajere fifty houses were destroyed. A new spring burst out at the mineral baths of Langaza. The shock was recorded at the observatory of Laibach, which is about 560 miles north-west of Salonica, and also in Birmingham, about 1440 miles in the same direction.

THE current number of the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale* contains the programme of prizes proposed by the Society for the present year. Among these may be noticed a prize of 2000 francs for the invention of a cement capable of agglomerating diamond dust for mechanical purposes, another of 3000 francs for a steam superheater fulfilling certain conditions, and one of 2000 francs for any important progress in the mechanical transmission of work. In chemistry a prize of 1000 francs is offered for the utilisation of a bye-product, and medals for publications useful to chemical industry or metallurgy. A prize of 2000 francs is offered for an apparatus suitable for domestic use capable of sterilising drinking water by boiling, one of 2000 francs for a study of the alcoholic ferments and diastases, and one of 1000 francs for freeing the vine from an insect parasite. In political economy, a prize of 3000 francs is offered for a study of the effects of trusts and industrial syndicates generally upon production and sale.

SEVERAL eruptions of Mont Pelée occurred last week. On July 9 a disturbance began at 7.30 p.m. and continued until midnight. From the *Times* we learn that a column of black smoke streaked with lightning was first observed, and that this was apparently followed by flame, which set fire to the ruins of St. Pierre. Stones and ashes fell for 25 minutes on Morne Rouge and Fonds St. Denis. Drs. Anderson and Fledd were thought to have been overwhelmed by the ejected matter, but they arrived safely at Fort de France on July 11. They were on board a sloop which was lying off St. Pierre when the eruption occurred. A message from St. Thomas states that three loud detonations were heard from the Soufrière, St. Vincent, between 8 p.m. and 9 p.m. on July 9. Advices from Barbados state that loud detonations were also heard there on the night of July 9, in a westerly direction. A telegram from Fort de France states that about midnight on July 12 there was a third violent eruption of Mont Pelée. Large quantities of stones and ash fell on Morne Rouge, Macouba and Ajouba Bouillon. The French scientific mission, which arrived the day before from Guadeloupe, whence it had been recalled by the Governor, left on July 13 for St. Pierre.

M. F. A. FOREL describes, in the *Journal Suisse* of July 10, some brilliant sky effects observed by him at Morges on July 5 directly after sunset. A brilliant disc of light of a whitish-yellow colour appeared thirty degrees above the sunset point a quarter of an hour after the sun had set, and lasted for a quarter of an hour. Ten minutes later a purple circle sixty degrees in diameter appeared, and sunk lower and lower as the sun increased its distance below the horizon. While this circle was visible the sky was brightened by an after-glow. The red sunset effects observed at Jamaica on May 25, Madeira on June 10, and Bombay about June 25 had not been seen at Morges on July 8.

IN the July number of the *Bulletin de la Société Astronomique de France*, M. Flammarión gives the first instalment of a history of the West Indian volcanoes, with special reference to Mont Pelée and the recent eruptions. The article is illustrated by photographs and charts, and contains letters of pathetic interest written a day or two before the great eruption, which show

that at least some of the inhabitants of St. Pierre, including several members of the Société Astronomique, feared the possibility of a disaster several days before the final catastrophe occurred.

MR. PIERPONT MORGAN has bought and presented to the Paris Museum of Natural History the collection of precious stones formed by Mr. Kunz, of New York, for the Buffalo Exhibition of last year. He has also sent to the American Museum of Natural History in New York a large star sapphire and a beautiful yellow sapphire. These gems will be added to the collection of precious stones previously presented by Mr. Pierpont Morgan to the Museum.

THE expedition to the Malay Peninsula undertaken by Mr. N. Annandale and Mr. H. C. Robinson with the aid of grants from the Government Grant Fund and Edinburgh University, has now concluded its field work, and it is hoped that a preliminary notice of its more important results may be presented to the British Association at Belfast. A complete series of anthropometrical measurements, representing more than 300 individuals of the various races "wild" and "civilised" inhabiting the Siamese Malay States and Perak, has been obtained, with numerous photographs and about thirty authenticated skeletons and skulls, nearly two-thirds of which belong to the primitive peoples known as "Sakais," "Semangs," and "Orang Laut" respectively. Studies have been made of the religions, burial customs, and sociology of these races, and collections of their clothing, weapons, utensils, and magical and musical implements made. The zoological results comprise extensive notes on mimicry and kindred phenomena and a series of photographs of insects and other animals in their natural surroundings as well as general collections from both high and low levels.

IT was recently reported that Dr. Doberck was retiring from the directorship of the Hong Kong Observatory; but we understand this is not the case and that he is merely home on sick leave.

A TELEGRAM from the Viceroy of India, dated July 12, reports:—"Good rain has fallen over the greater part of India, but fall light in Burma, in Southern India, Southern Punjab, in parts of Rajputana and Sind."

A BRITISH and Colonial Industrial Exhibition will be held at Cape Town for a period of four months from November 1903. All the necessary funds have been guaranteed, and a site adjoining the Botanic Gardens has been chosen. It is important that British manufacturers should participate in a scheme which offers a good opportunity of bringing their products and wares before the South African public, especially in view of the inroads made by foreign competitors in the South African market. When the exhibition is open the industries of farming, dairying, and wine growing will be busy in schemes for a fresh start. The exhibition of the latest and most up-to-date appliances, tools, mechanism and machinery should, therefore, lead to very extensive business, and the opening of new and permanent trade outlets for Imperial manufactures.

THE preliminary programme of the nineteenth congress of the Sanitary Institute, to be held in Manchester on September 9-13, has now been issued. The president of the congress is Earl Egerton of Tatton. Dr. W. N. Shaw, F.R.S., will deliver the lecture to the congress and Sir W. J. Collins will deliver the popular address. The three sections and their presidents will be:—(1) Sanitary science and preventive medicine, Sir James Crichton-Browne, F.R.S.; (2) engineering and architecture, Sir Alexander Binnie; (3) physics, chemistry and biology, Prof. A. Sheridan Delépine. There will be eight special conferences of municipal representatives,

port sanitary authorities, medical officers of health, engineers and surveyors to county and other sanitary authorities, veterinary inspectors, sanitary inspectors, domestic hygiene, and hygiene of school life. In connection with the congress, a health exhibition of apparatus and appliances relating to health and domestic use will be held, as a practical illustration of the application and carrying out of the principles and methods discussed at the meetings.

THE announcement that the meteorological observatories on Ben Nevis and in Fort-William will have to be closed at the beginning of October next, in consequence of the want of funds to keep them in operation, will be received with regret by many meteorologists and other men of science. During the last four years the liberality of Mr. Mackay Bernard, of Dunsinnan, made the continuation of the work at the observatories possible, but there is no hope, in the opinion of the directors, that the observatories can be continued as permanent institutions except by assistance from the State. From the commencement of the work, in 1883, until now, the total cost has been fully 24,000*l.* Of this sum nearly 17,000*l.* has been received by the directors in the form of subscriptions. The balance of the expenditure has been met by a payment of 100*l.* a year, since 1883, from the Meteorological Council for the Ben Nevis Observatory, and of 250*l.* a year from the same body, since 1890, for the Fort-William Observatory. These two contributions constitute all that can be regarded as State aid. The directors have received definite intimation that, whether the observatories are continued or not, the latter sum—250*l.*—is to cease to be paid at the end of this year. In connection with this subject we notice that Sir John Stirling-Maxwell has notified the Lord Advocate that he will put a question this week in the House of Commons as to whether any application has been made through the Scottish Office for assistance for the observatory from the public purse, and whether, if such application has been refused, he will state the grounds of refusal.

AT the Aëronautical Congress held recently at Berlin it was concluded that no ascent should take place at a higher level than 7 or 8 kilometres without placing the observers within a closed car, "nacelle close," as was suggested, in 1871, by Mr. Louis Tridon. At that time a motion to this effect was rejected on account of the faith it places in the life-sustaining properties of pure oxygen. The scientific committee of the Aëro Club discussed this same subject on June 30 and came to the same conclusions. Dr. Henocque, professor of physiology at the Collège de France, said that the foregoing principles will be observed in the ascents now in preparation by the French Society of Physiology. He held that the atmosphere should be divided into three zones; that in the first, up to 4 or 5 kilometres above the sea-level, life was possible without the use of additional gas. For the third zone, at a level less than 10,000 metres, it would be necessary to resort to the closed car, or to an aërial diving suit. The ascents which Dr. Henocque arranged to take place on July 15, were to be executed entirely in the first zone. Investigation was to be made of the effects of the ascents within the limits of a depression consistent with life, or not ruinous to health, and in accordance with a series of observations made at the Eiffel Tower. Dr. Henocque hopes to show that in this zone the ascents may be considered as beneficial to the general health, invigorating the lungs and likely to afford a remedy against some pulmonary affections. The conditions of life are not the same as when mountaineering, owing to the greater velocity due to the elevation and the absence of all muscular fatigue when the aërial traveller is comfortably seated in the car of a balloon.

ACCORDING to the *Times*, there is likelihood of large supplies of electrical and mining machinery being required shortly for

Johannesburg, where an extensive electric tramway system is to be built. There is a desire to place orders as far as possible with British firms, but freights are very heavy, and British machinery requires therefore to be made lighter. Prompt delivery and lower prices are also needed to meet American and German competition; it is said that several orders have recently been secured by foreign firms at very low prices in order to secure a firm footing in the market.

A NEW oxygen-acetylene burner has been devised by M. Fouché (says the *Engineer*, July 11) which not only has a much higher temperature, but also the admixture of ether vapour is prevented. The ratio of the mixture [is 1 volume of acetylene to 1·8 volumes of oxygen, and the flame, which is 6 mm. long, has a greenish dart in the centre with a point at a very high temperature. Iron and steel, it is claimed, can be easily welded without either oxidising or carburising the iron.

IN an Appendix iii. to the Weekly Weather Report for the year 1901, the Meteorological Council has recently issued a very useful set of tables showing for the stations which furnish returns for that Report and the monthly summaries, (1) the average maximum, minimum and mean temperatures for each month, and for the whole year for thirty years (1871–1900); (2) the average monthly rainfall and number of rain-days for thirty-five years (1866–1900); and (3) the average number of hours of bright sunshine and percentages of possible duration for twenty years (1881–1900). These tables are in continuation of those issued in the preface to the Weekly Weather Report for 1895, and furnish at a glance valuable information on the climatology of each of the districts into which the British Islands have been divided for the purpose of weather forecasts.

MR. W. E. COOKE's report on meteorological observations made under his direction at the Perth Observatory and other places in Western Australia during the year 1900 contains an excellent collection of monthly and yearly climate and rain maps referring to the colony. One series of the maps shows for every month the mean pressures and temperatures and the mean maximum temperatures at day and minimum temperatures at night; also the annual means of the same records. In another series the amount of rainfall for every month of the year is shown graphically in each square degree of the colony, with the average rainfall for that district; and the distribution of the rainfall for the whole year is shown in the same way in a separate map. Mr. Cooke reports that the astronomical buildings of the Perth Observatory are now finished and the instruments in adjustment. The observatory is pledged to take a share in the preparation of the International Photographic Catalogue of Stars, but owing to want of assistants, it is difficult to obtain time for the work. The meteorological observations are, however, kept up at a fair number of stations, and the results for various localities throughout the State obtained since 1875 have been examined, tabulated and discussed, and will shortly be available in a volume entitled "The Climate of Western Australia."

MR. KUMAGUSU MINAKATA sends us from Japan two specimens, mounted as microscopic slides, of a fresh-water alga which he collected in a pond at Wakayama Shi, Japan. He desired to obtain an opinion as to the species, which he believed to be *Pithophora Oedogonia*, Wittrock, var. *vaucherioides*, Wille, of which he possessed a quantity of specimens personally collected near Jacksonville, Florida, between 1891–92, well agreeing in detail with those submitted. He also remarked:—"Since the publication of Wittrock's elaborate monograph of the Pithophoraceæ, 1877, has any species, besides *P. Kewensis*, been ever reported from any other part of the Old World?" Prof. Howes, to whom we submitted the specimens, says in reply:—"I have no doubt that the Japanese identification is

correct. Mr. Rendle, with a former pupil of mine, Mr. W. West, jun., has described as new for Britain a variety of the genus from a canal in Manchester, where it was assuredly introduced (see *Journal of Botany*, vol. xxxvii., 1899, p. 289). I take his word as final. Mr. Minakata may be referred to the above-cited paper for the answer to his second question. *P. Kewensis* must have also been introduced, as it has never been found again."

PROF. T. LEVI CIVITA has contributed to the *Annales* of the Faculty of Sciences of Toulouse a paper having an important bearing on the recent discussions as to the production of a magnetic field by moving charges. In a previous paper on that subject, Prof. Righi had examined the possible sources of error in various experiments, from those of Rowland down to the recent observations of Cremieu and Adams, and had pointed out that some uncertainty was introduced by the presence of the conductor used to shield the magnetic needle from electrostatic action. This remark has led Prof. Levi Civita to undertake a mathematical investigation of the effect of an infinite plane-conducting screen on the magnetic field produced by an electrostatic charge moving uniformly parallel to the plane. The results which are embodied in the present paper show that if  $a$  is the ratio of the velocity of translation to that of light, then up to the order of  $a^2$ , the electric and magnetic forces on the side of the screen opposite to the moving charge are derivable from a potential. The electric force is negligible, while the magnetic force is reduced to a certain fraction, less than one-half, of what it would be at the same point if the conductor were removed. The magnetic force is not, however, entirely screened by the conductor except in the limiting case when the sheet has infinite conductivity.

THE unique construction of the "Cooke" photographic lenses, made by Messrs. Taylor, Taylor and Hobson of Leicester, has given rise to possibilities of variation of their focal lengths by the user, that are both interesting and useful. The replacement of the back component by a lens of greater focal length, increasing the focal length of the objective by about 50 per cent. we referred to some time ago, the alternative back lens being known as an "extension lens." Messrs. Taylor, Taylor and Hobson have now formulated a method by which the focal length may be reduced. This is effected by unscrewing the front component. One complete turn shortens the focal distance of a five-inch lens by nearly half an inch. Such a difference is of little use with reference to the resulting alteration in the scale of the image, though it may sometimes be convenient. But when applied as an alternative to the use of rack-work and other devices for increasing the distance between the lens and the plate for focussing purposes, as in the use of hand-cameras for comparatively near objects, this range is ample. Without moving either the objective as a whole or the plate, less than half a rotation of the front component of an objective of five inches focal length will alter the distance of the object that is in focus from infinity to three yards. The makers take advantage of this fact in a new issue of their lenses, in which a scale is engraved on the mount so that objects at infinity, ten, six, four and three yards' distance may be brought into focus by this simple means. Within this range the defining power of the objective from corner to corner of a quarter plate, using the full aperture of  $f/6.5$ , is so little affected that the deterioration of the image at the edges of the plate can only be detected by means of a magnifier. The advantages of this method of focussing are that it is more simple from a constructional point of view than others now in use, saving the weight of those parts hitherto necessary simply for focussing purposes, and that as the lens and plate may be rigidly fixed in their relative positions, there is less risk of instability or misplacement with the con-

sequent deterioration of definition. The same principle is applicable when the "extension lens" is employed, thus further increasing the range of adjustment possible.

MESSRS. R. FRIEDLANDER UND SOHN, of Berlin, have issued two catalogues of floras, one of European, the other of exotic plants.

ACCORDING to the Report for 1901, the Manchester Microscopical Society continues to do excellent work, although the hon. secretary has to deplore a diminished attendance at the meetings.

*Nature Notes* for July contains a notice of Mr. E. N. Buxton's efforts for the re-afforestation of a large part of the old Hainault Forest, which was deforested about 1850. The cost will be about 20,000*l.* for the Lambourne and Hainault lands, and 7000*l.* for the Grange Hill Forest. It is proposed to ask the great City Corporations and the Essex County Council to bear the main cost, although much financial help is expected from private beneficence and local bodies.

IN a paper published in vol. lxxi. of the *Journal* of the Asiatic Society of Bengal Mr. F. Finn notices certain instances of what he terms "abrupt variation" in Indian birds. Among them he notices a not uncommon colour-phase in the ruff, and for the birds displaying this peculiarity he proposes the name *Pavoncella pugnax leucoprora*; this, it may be mentioned, is not in accordance with modern practice, which restricts sub-specific titles to local geographical forms. The author also calls attention to a domesticated cock in the Indian Museum, described many years ago by Blyth, which has partially assumed the female plumage, and appears to be the only known example, at least in India, of such an abnormality.

THE failure of pea crops forms one of the more important items in the *Bulletin* issued this year by the authorities of the agricultural experiment station at Fort Collins, Colorado. It was discovered that the soil was permeated with the hyphae of a *Rhizoctonia*, similar to, if not identical with, that which is destructive to potatoes. Peas are more resistant to the attacks of this fungus than potatoes, but under certain conditions, such as in a heavy soil which holds the water and while the plants are young, the fungus gets the better of the struggle. In the case of seeds taken from diseased potato plants, treatment with solutions of corrosive sublimate or formalin has been found to prove efficacious, and probably this will also hold good for peas. A *Rhizoctonia* was also found to be the cause of disease on blackberries. Injurious effects of spraying apple trees with Bordeaux mixture are reported, causing malformation of the fruit. These and other pathological effects are illustrated by excellent plates produced from photographs.

CAPTAIN STANLEY S. FLOWER has issued his Report, for 1901, on the Zoological Gardens at Ghizeh, near Cairo, which are now placed under the Public Works Department of the Government of Egypt. The Report gives an excellent account of the condition and progress of this institution, which seems to have prospered greatly under Captain Flower's directorship. The Gardens, which extend over about 50 acres, are beautifully treed and kept up; they are situated at Ghizeh on the left bank of the Nile, and are connected with Cairo by tramway. They contain living examples of about 700 species of mammals, birds and reptiles, and a great variety of plants. The number of visitors increases every year, and was 52,711 in 1901. The latest additions to the buildings are an elephant house, a lion house and a large aviary, besides other smaller structures. It is stated that examples of forty-five different species of wild birds were observed within the Gardens in 1901.

USEFUL suggestions for laying out, planting and cultivating a garden and grounds are given by Mr. T. W. Sanders in the second number of the series of rural handbooks in course of publication by Messrs. Dawbarn and Ward. Seven plans are given for laying out plots varying in area from a quarter of an acre to ten acres; and anyone free to follow the designs set forth, and capable of waiting patiently for the trees and shrubs to develop, may act with advantage upon the concise instructions which Mr. Sanders gives.

A CHEAP edition (price 6d.) of Laing's "Modern Science and Modern Thought," revised and brought up to date, with a biographical note by Mr. Edward Clodd, has been issued for the Rationalist Press Association by Messrs. Watts and Co. With reference to the revision which the advance of knowledge during the last seventeen years has rendered necessary, Mr. Clodd remarks:—"The portions thus affected are those dealing with the continuity of Palæolithic and Neolithic man in Continental Europe; with the recent discovery of remains, probably of an intermediate form between man and ape, in Java; and with the remarkable discoveries in Babylonia, which appear to accord to that empire on earlier civilisation than that of Egypt."

MR. BENJAMIN KIDD is leaving England shortly for South Africa, in connection with studies on which he is engaged. Since the publication of "Principles of Western Civilisation" he has been occupied with articles of some length for the "Encyclopædia Britannica." One of these deals with the application of the doctrine of evolution to society. The article on sociology in the new edition will be contributed by Mr. Kidd.

THE question as to whether tellurium or iodine possesses the larger atomic weight has given rise to many researches since Mendeléeff pointed out that the conclusion drawn from the periodic system was opposed to the experimentally determined facts. This work has hitherto been principally devoted to tellurium, partly because as the rarer and lesser known element tellurium might possibly contain elements of higher atomic weight, but chiefly because the work of Stas in regard to iodine appeared so convincing that further determinations of this constant for iodine would be superfluous. Since all the work done on tellurium tends to show that its atomic weight is decidedly higher than that of iodine, Prof. Ladenburg has attacked the question from the other side, and has redetermined the atomic weight of iodine, using methods of purification differing from those adopted by Stas; the result is in almost absolute agreement with the usually accepted figure, so that the discrepancy between the conclusions of the periodic law and the results of experiment still remains unexplained.

THE current number of the *Berichte* contains a paper by Dr. W. Marckwald on polonium, the radioactive constituent of bismuth. The discoverers of these radioactive elements, M. and Mme. Curie, after numerous attempts to isolate this element, concluded that polonium is a species of active bismuth, and that there is as yet no proof that it contains a new element. Dr. Marckwald, after numerous fruitless experiments, has succeeded in obtaining a minute amount of polonium in a manner which would appear to exclude the possibility of its identity with bismuth. Starting with some kilograms of residues from pitchblende, about 1 per cent. of strongly radioactive bismuth oxychloride was obtained, and it was proved that this activity remained unchanged after several months. The acid solution of this was then treated with a stick of pure metallic bismuth, the metal becoming after some time coated with a black deposit. It was found that the activity of this deposit, as measured by the electroscope, far exceeded that of the original solution, the residual solution having lost its activity during the deposition. No deposit was seen when a second stick of bismuth was

placed in this exhausted solution. The total weight of polonium obtained was only 5 milligrams, corresponding to an amount not exceeding 1 gram per ton of pitchblende. The author hopes to be able to obtain sufficient material to carry out an atomic weight determination.

ALTHOUGH the fact of the existence of a gaseous antimony hydride has been known for many years, it is only comparatively recently that it has been obtained in the pure state, and the accounts of the stability of the pure hydride differ considerably. Thus, according to Olszewski, who first succeeded in solidifying the gas, decomposition with separation of antimony occurs readily even at  $-90^{\circ}\text{C}$ . The current number of the *Berichte* contains a paper on this subject by A. Stock and W. Doht. In order to obtain as rich a gas as possible, they made a careful study of the composition of the gas evolved from a series of alloys of antimony with zinc, sodium, calcium and magnesium, and they found that the magnesium alloy was much the best for the purpose. Thus, whilst the zinc-antimony alloys never yielded a gas containing more than 1 per cent. of the hydride, an alloy of one part of antimony with two of magnesium gave hydrogen containing from 10.4 to 14 per cent. of the antimony hydride. From this mixture the pure gas was easily solidified out with liquid air, melting at  $-88^{\circ}\text{C}$ . and boiling at  $-17^{\circ}\text{C}$ . The solid melts to a clear liquid, and evaporates without leaving any trace of antimony, and, in fact, the gas may be kept at the ordinary temperature for some hours before decomposition sets in.

THE additions to the Zoological Society's Gardens during the past week include a Brown Capuchin (*Cebus fatusellus*) from Guiana, presented by Madame Delmas; two Ocelots (*Felis pardalis*), two Common Boas (*Boa constrictor*) from South America, presented by Captain W. H. Lacy; two Giraffes (*Giraffa camelopardalis*, ♂ & ♀) from Kordofan, two Cheetahs (*Cynoleurus jubatus*), three Secretary Vultures (*Serpentarius reptilivorus*) from Africa, presented by Colonel Mahon; a Green Woodpecker (*Geococcyx viridis*) British, presented by Mr. J. T. Jones; a Roseate Cockatoo (*Cacatua roseicapilla*) from Australia, presented by Miss Ina King; five Lions (young) (*Felis leo*), two Grévy's Zebras (*Equus grevyi*, ♀ & ♂) from Southern Abyssinia, a Campbell's Monkey (*Cercopithecus campbelli*) from West Africa, five Pratincoles (*Glareola pratincola*), European, two Lesueur's Terrapins (*Malacoclemmys lesueuri*), two prickly Trionyx (*Trionyx spinifer*), an Alligator Terrapin (*Chelydra serpentina*) from North America, two Striated Snake-head Fish (*Ophiocephalus striatus*) from India, two Egyptian Geese (*Chenalopex aegyptiacus*) from Africa, deposited; an Orang-Outang (*Simia satyrus*) from Borneo, two Golden-backed Woodpeckers (*Brachypternus aurantius*), an Indian Roller (*Coracias indica*) from India, two White-eyebrowed Guans (*Penelope superciliosus*) from South-east Brazil, purchased; a Duke of Bedford's Deer (*Cervus xanthopygius*) born in the Gardens.

#### OUR ASTRONOMICAL COLUMN.

BRIGHT METEOR OF JULY 13.—Several correspondents send particulars of a brilliant meteor observed over a wide area last Sunday evening, July 13, about 10.30. According to charts sent by Prof. F. J. Allen from Cambridge, and Mr. A. Macrae from Crouch End, the meteor, which was probably sporadic, first appeared at an altitude of about  $40^{\circ}$ , and travelling in a N.E.-S.W. direction crossed a line joining Jupiter and Markab at right angles, at about  $25^{\circ}$  from the former. The meteor travelled very quickly and was intensely bright. Prof. Allen says:—"It illuminated the landscape like a considerable flash of lightning, though the moon shone and incandescent lights were near." Its colour is given as "violet-white." Mr. C. Waterer, of Margate, also remarks:—"It lighted up the whole